

(19) World Intellectual Property Organization
International Bureau(10) International Publication Number
WO 03/080161 A1(43) International Publication Date
2 October 2003 (02.10.2003)

PCT

(51) International Patent Classification:
A61M 15/00,
B65D 83/16(72) Inventor; and
(75) Inventor/Applicant (for US only): BACON, Raymond,
John (GB/GB); The Downer House, Aldworth, Embsworth,
Hampshire PO10 8QT (GB).

(21) International Application Number: PCT/GB03/01102

(22) International Filing Date: 17 March 2003 (17.03.2003)

(74) Agent: BROOKS, Nigel; Hill Hampton, East Meon, Pa-
terfield, Hampshire GU32 1QN (GB).

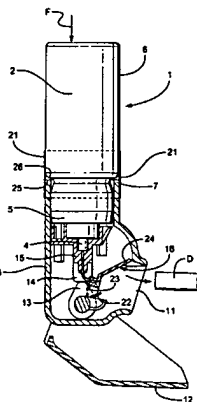
(25) Filing Language: English

(81) Designated States (national): AR, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GR, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, SL, TJ, TM, TR, TT, UA, US, UZ, VN, YU, ZA, ZW.

(26) Publication Language: English

(36) Priority Date: 22 March 2002 (22.03.2002) GB
0204811.2
0227489.2 26 November 2002 (26.11.2002) GB(71) Applicant (for all designated States except US): CLINI-
CAL DESIGNS LIMITED (GB/GB); The Downer House,
Aldworth, Embsworth, Hampshire PO10 8QT (GB).(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
European patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
[Continued on next page]

(54) Title: CAN FIXTURE



(57) Abstract: A dispenser (1) comprises a can (2) and a body (3). The can is an aluminium extrusion with a valve crimped into its mouth, the valve having an outlet spout (4). The crimped region (5) of the can surrounding the valve has a lesser diameter than the can has through the main part (6) of its length. The body has a mouthpiece (11) with a pivotal cover (12) drivingly connected to a cam (13). This bears on the underside of a junction member (14), into a socket (15) of which the spout (4) fits. A breath actuated dose release mechanism (16) is provided. The body has a tubular section (7) for receiving the necked down region (5) of the can. The tubular section and the main part of the can having the same external diameter. A printed paper label (21) coated with self-adhesive is wrapped around the joint between the body and the can to ensure the can is in position such that when the cover is opened, a dose is dispensed by the can (13) biting the junction member and depressing the spout. In order to establish correct positioning of the can with respect to the body, prior to positioning of the label, a predetermined force (F) is applied to ensure that the spout is fully depressed. This causes the can to release into the release mechanism a dose, which will usually be a metered dose. Thus in this position of the can in the body, when the cover is opened in use, another dose will be released. With the force still applied the label is applied to the can and the body fixing their relative position.

WO 03/080161

PCT/GB03/01102

WO 03/080161

2

PCT/GB03/01102

CAN FIXTURE

The present invention relates to a source fixture particularly, though not exclusively, for a source of a metered dose in a dispenser of aerosol or powder borne medicaments.

Dispensers for inhalation of a metered dose of a medicament are widely used. In simple form, they comprise a body having a mouthpiece and an aerosol can. The can is connected to the body via its spout, which engages in a junction in the body leading to a nozzle opening towards the mouthpiece. Depression of the can towards the body dispenses the dose.

In a breath actuated dispenser, such as described as the second embodiment in our International Application No. PCT/GB01/03313, dated 24th July 2001, the can is fixed to the body and a slidable junction member receives the can spout. A cam mechanism displaces the junction member – and the spout – towards the can, dispensing the dose into the breath actuable mechanism. In that application, we envisaged locating the can by detents engageable in a groove formed around the can, at which a can closure is crimped onto the can proper. However, we have noticed that appreciable differences can exist between the depressed position of the distal end of the spout and the groove portion at which the detents engage due to the build up of tolerances. The problem is exacerbated by the detents and the groove engaging at oblique surfaces, whereby radial tolerances can influence longitudinal position. The result is that the can is insufficiently accurately located longitudinally with respect to the body and the cam mechanism.

The object of the present invention is to provide a more satisfactory fixture of the can to the body.

According to the invention there is provided a dispenser for a gaseous, gas borne or droplet substance contained in a source thereof, the dispenser comprising:

- a substance source having:

- an external surface devoid of any feature intended for longitudinal location of the source and
- a spout displaceable inwards of the source to a dispense position for dispensing a substance dose from the source;
- a body having:
 - a mouthpiece via which the substance dose can be inhaled and
 - a socket sized for lateral location of the source via its external surface, but devoid of any body feature intended for longitudinal location thereof;
- a junction member for the spout, the junction member being arranged in the body to be slidable to a set position for displacing the spout to its dispense position;
- an action for slidably moving the junction member to the set position; and
- a unification of the source or a source locator to the body for locating the source longitudinally with the spout in its dispense position when the junction member is in its set position, the locator where provided extending from the body, outside the source and at least partially across the end of the source to provide a longitudinal location for the source, locating it when the movable junction member acts to depress the spout inwards of the source.

According to another aspect of the invention there is provided a method in the production of a dispenser of the first aspect of the invention, the method consisting in the steps of:

- arranging the junction member in the body at its set;
- longitudinally assembling the source to the body, with the spout engaged with the junction member;
- temporarily holding the body and the source in a unification position with the spout in its dispense position and the junction member still in its set position; and
- unifying the body and the source together to fix them in their unified position.

Normally the dispenser will include a breath actuation mechanism for releasing the junction member from its set position, whereby the dose is released to the patient and the spout returns from its dispense position to its normal position.

With such a dispenser, the unification step can be followed by a simulated breath actuation. Alternatively, where the action for sliding the junction member to its set position may be adapted to actuate the mechanism in the absence of a simulated breath to return the spout and the junction member to their normal positions.

The unification can be of adhesive between the source and the body, normally in the socket of the body. The body and/or the source or the locator can have a re-entrant feature and the body or the locator can have an aperture communicating with the re-entrant feature through which the adhesive was injected. The re-entrant feature can be an internal groove in the body or the locator for receiving the adhesive for a bond with the source or the body respectively. Alternatively or additionally, the re-entrant feature can be an external groove in the source at a crimp for retaining the spout and the source proper. The injected adhesive can be low temperature hot melt adhesive or fast setting two part adhesive. In either case, the adhesive will set on injection.

Alternatively the unification can be a weld between the source and the body or between the source locator and the body, the welding being performed preferably by ultrasonics or by laser.

A further alternative is a membrane such as a wrapping or a printed label around both the source and the body and unified to both. This alternative can be additional to the use of an adhesive or a weld.

Whilst it is envisaged that the membrane may be of paper, it equally may be of plastics material.

The membrane may be circumferentially continuous around the body as in a shrink wrapping, or it may be discontinuous, as in a label wrapped largely around them. It is also conceivable that two or more separate membranes could be used, one to one side and the other to the other side.

In accordance with particular feature of the invention, the source and the body are relatively located in the temporary holding step by:

- urging the source towards the junction member with a force sufficient to depress the spout towards the source proper and dispense a dose of the substance to the junction member.

To help understanding of the invention, specific embodiments thereof will now be described by way of example and with reference to the accompanying drawings, in which:

Figure 1 is a cross-sectional side view of a dispenser of the invention, shown in a closed position;

Figure 2 is a similar ordinary side view;

Figure 3 is a view similar to Figure 1 of the dispenser during unification of its can to its body;

Figure 4 is a similar view partially in cross-section of a variant of the dispenser

Figure 5 is a cross-sectional side view of another dispenser of the present invention, shown in a closed position;

Figure 6 is a similar view of a further dispenser of the invention;

Figure 7 is a similar view of yet another dispenser of the invention;

Figure 8 is a similar view of yet a further dispenser of the invention; and

Figure 9 is a similar view of the last described dispenser of the invention.

Referring first to Figures 1 & 2 of the drawings, a dispenser 1 comprises a can 2 and a body 3. The can is an aluminium extrusion with a valve crimped into its mouth, the valve having an outlet spout 4. The crimped region 5 of the can surrounding the valve has a lesser diameter than the can has through the main part 6 of its length.

The body has a mouthpiece 11 with a pivotal cover 12 drivingly connected to a cam 13. This bears on the underside of a junction member 14, into a socket 15 of which the spout 4 fits. A breath actuated dose release mechanism 16 is provided. Its details form no part of the present invention. The reader is referred our International

The membrane may have self-adhesive applied to it or adhesive may be applied directly to the source and the body. Indeed the membrane can be of material which is self-adhesive.

Where the label is a continuous tube, it can be applied as a shrink wrapping. This is particularly advantageous where the body and the source are of different diameters. A shrink wrapping may grip the body and the source sufficiently tightly to unify them together without requiring adhesive. Alternatively, this may be applied for instance as hot melt. The body and/or the source may be contoured to enhance the grip of the shrink wrapping on them. Such contouring may be used for adhesive labels.

Again, it is envisaged that the membrane may be welded, as by ultra-sonic welding to either or both of the source and the body. Whilst the latter is currently of plastics material, the former is likely to be of plastics material in due course, facilitating welding. Ultrasonic welding is possible even where the source is of metal or indeed of glass provided they are coated with plastics material or indeed even if they are not, provided that the welding causes the melted body material to adhere to the source – when cooled again – sufficiently for no relative movement between them under normal use conditions.

More specifically, the following weldings can be envisaged:

- Where the source is essentially of plastics material or at least has a plastics material portion, such as its main containing portion, engageable with the body, the two can be ultrasonically welded together.
- Similarly, where the source has a glass container, typically with a valve connected to it by a crimped ferrule, and the glass is covered with a plastics material, either as a shrink wrapping or a spray coating or insert moulding or co-moulding, and the glass container fits closely within the body, the two can be ultrasonically welded together.
- Again, where the source is metallic, either of plastics material coated metal or with sprayed on plastics material, the source can be welded to the body where the two engage with each other. This is possible either as regards a main container of the source or a crimped on ferrule.

Application mentioned at the beginning of this specification for details of this mechanism.

The body has a tubular section 7 for receiving the necked down region 5 of the can. The tubular section and the main part of the can having the same external diameter.

A printed paper label 21 coated with self-adhesive is wrapped around the joint between the body and the can to unite the can to the body in position such that when the cover is opened, a dose is dispensed by the cam 13 lifting the junction member and depressing the spout. The dose is retained since the action of opening of the cover sets the breath actuation mechanism. On breathing in through the mouthpiece by the user, the mechanism releases the dose for inhalation.

In order to establish correct positioning of the can with respect to the body, prior to positioning of the label, during assembly of the dispenser, the pre-assembled body 3, cover 12, junction member 14 and release mechanism 16 are set to their "cover open" position as shown in Figure 3, i.e. with the cover pivoted down from the Figure 1 position. When the dispenser comes to be used, the Figure 3 position is one in which with the can united to the body, the release mechanism is lifted to move the spout 4 inwards of the can, i.e. the spout is depressed. With the mentioned components set to their "cover open" position a can is introduced into the tubular section of the body. With the can and body properly aligned, the spout engages in the socket 15 in the junction member. A predetermined force F is applied to ensure that the spout is fully depressed. This causes the can to release into the release mechanism a dose, which will usually be a metered dose. Thus in this position of the can in the body, when the cover is opened in use, another dose will be released. With the force still applied the label is applied to the can and the body fixing their relative position.

The label can pass fully around the can or merely pass most of the way around.

Once the can and the body are united by the label, air can be drawn into a duct D close to the mouthpiece to induce the release mechanism to release the dose. The

cover can then be closed and the dispenser is ready for shipping and use.

Alternatively, the cover can be closed without induced release. The closure causes a finger 22 fast with the cam to engage with a finger 23 fast with the flap 24 of the release mechanism whereby the flap is moved to its Figure 1 position and the dose is released.

It should be noted that whereas a superficial inspection of Figures 1 and 3 might suggest that the can is located by abutment between the end 25 of the tubular section of the body and the step 26 in the can, there is clearance between these features when the can is pushed in to its position in which spout is depressed and the release mechanism is set.

Alternatively the label can be a shrink wrap label 31, as shown in Figure 4. This is of particular advantage where the body stands slightly proud of the can, as shown in Figure 3, in that a tapered portion 32 of the label bridges the change in diameter from the larger diameter tubular section 33 to the smaller diameter can 34. The tapered portion acts in tension in use of the device. To enhance grip of the shrink wrap, the can and body can be provided with adhesive 35 and/or surface formations 36.

Referring to Figure 5 of the drawings, the dispenser 101 there shown comprises a can 102 and a body 103. As with the dispenser of Figure 1, the can is an aluminium extrusion with a valve crimped into its mouth, the valve having an outlet spout 104. The crimped ferrule 105 connecting the valve to the main part 106 of the can has a lesser diameter than the can has through the main part of its length.

The body has a mouthpiece 111 with a pivotal cover 112 drivingly connected to a cam 113. This bears on the underside of a junction member 114, into a socket 115 of which the spout 104 fits. A breath actuated dose release mechanism 116 is provided. The body has a tubular section 107 for receiving the ferrule 105 of the can. The tubular section and the main part of the can having the same external diameter.

The ferrule is made of aluminium with a coating 121 of polypropylene of sufficient thickness that it can be ultrasonically welded 122 to the tubular section 107

whereby the adhesive 411 locates the source in the body not only by its adhesive nature, but also as a solid block keying into both the features. It can also be envisaged that, where the source has little or no groove at the joint between the crimped on valve for the spout and the can proper, the re-entrant groove in the tubular section 407 may be relied on alone to provide the flow passage for the adhesive.

Figure 9 shows a further dispenser of the invention, with a source locator 550. It is a plastics injection moulding. It surrounds the can 506 with a generally cylindrical sleeve 551 along the length of the can extending from the tubular section 507 of the body 503. The sleeve of the locator has an in-turned closure 552 at its end remote from the body 503. The can is a loose fit within the locator sleeve, which allows positioning force *F* on the sleeve to be conveyed to the can of the source for its correct positioning. The polymers of the locator and of the body are chosen whereby the sleeve is transparent to laser irradiation, whilst the body absorbs the radiation, thus melting and forming a weld 553 with the locator, at their overlap 504 when the parts are properly located and irradiated for locating the can and the body.

The invention is not intended to be restricted to the details of the above described embodiment. For instance, the weld can be replaced by adhesive. Further the embodiment of Figure 4 can be varied with the shrink wrapping extending along the full length of the source – shown in dashed lines in Figure 4 – and just over its end 41. Thus the shrink wrapping holds the can not only by friction along its length but by physical location where it forms a rim 42 at the end of the can.

of the body. The can is welded into the body in such position that when the cover is opened, a dose is dispensed by the cam 13 lifting the junction member and depressing the spout. The dose is retained since the action of opening of the cover sets the breath actuation mechanism. On breathing in through the mouthpiece by the user, the mechanism releases the dose for inhalation.

In order to establish the correct positioning prior to welding, during assembly of the dispenser, the pre-assembled body 103, cover 112, junction member 114 and release mechanism 116 are set to their "cover open" position, i.e. with the cover pivoted down from the Figure 5 position, in which in the presence of the can the release mechanism is lifted to depress the spout 104. The can is introduced into the tubular section of the body. With the can and body properly aligned, the spout engages in the socket 115 in the junction member. A predetermined force is applied to ensure that the spout is fully depressed. This causes the can to release into the release mechanism a dose, which will usually be a metered dose. Thus in this position of the can in the body, when the cover is opened in use, another dose will be released. With the force still applied the can is ultrasonically welded in position.

Figure 6 shows an alternative, in which the tubular body section 207 is longer and the can proper 206 has the same diameter as the ferrule 205. Both the ferrule and the can are spray coated with polypropylene whereby a weld 222 can be established with the section 207, both at the ferrule and the portion of the can within the tubular body section.

Figure 7 yet another alternative where the "can" proper 306 is of glass and spray coated with polypropylene. This is welded 322 to the body section 307 surrounding it.

Figure 8 shows another glued dispenser. It has an aperture 410 in its tubular section 407, through which low temperature hot melt adhesive or fast curing two-part adhesive can be injected to set in the groove 409 between the crimped portion 405 of the can and the main body portion 406. A further groove 408 can be provided in the tubular section, to provide a larger cross-sectional area flow path for the adhesive and also to provide a re-entrant key in both the body and the source for the adhesive,

CLAIMS:

1. A dispenser for a gaseous, gas borne or droplet substance contained in a source thereof, the dispenser comprising:
 - a substance source having:
 - an external surface devoid of any feature intended for longitudinal location of the source and
 - a spout displaceable inwards of the source to a dispense position for dispensing a substance dose from the source;
 - a body having:
 - a mouthpiece via which the substance dose can be inhaled and
 - a socket sized for lateral location of the source via its external surface, but devoid of any body feature intended for longitudinal location thereof;
 - a junction member for the spout, the junction member being arranged in the body to be slidable to a set position for displacing the spout to its dispense position;
 - an action for slidably moving the junction member to the set position; and
 - a unification of the source or a source locator to the body for locating the source longitudinally with the spout in its dispense position when the junction member is in its set position, the locator where provided extending from the body, outside the source and at least partially across the end of the source to provide a longitudinal location for the source, locating it when the movable junction member acts to depress the spout inwards of the source.
2. A dispenser as claimed in claim 1, including a breath actuation mechanism for releasing the junction member from its set position, whereby the dose is released to the patient and the spout returns from its dispense position to its normal position.
3. A dispenser as claimed in claim 1 or claim 2, wherein the action for sliding the junction member to its set position is adapted to actuate the mechanism in the absence of a simulated breath to return the spout and the junction member to their normal positions.
4. A dispenser as claimed in any preceding claim, wherein the unification is of adhesive between the source or the locator and the body
5. A dispenser as claimed in claim 4, wherein the adhesive is in the socket of the body.

6. A dispenser as claimed in claim 4 or claim 5, wherein the body and/or the source or the locator have a re-entrant feature and the body or the locator has an aperture communicating with the re-entrant feature through which the adhesive was injected.
7. A dispenser as claimed in claim 6, wherein the re-entrant feature is an internal groove in the body or the locator for receiving the adhesive for a bond with the source or the body respectively.
8. A dispenser as claimed in claim 6, wherein the re-entrant feature is an external groove in the source at a crimp for retaining the spout and the source proper.
9. A dispenser as claimed in claim 1, claim 2 or claim 3, wherein the unification is a weld between the source or the locator and the body.
10. A dispenser as claimed in claim 9, wherein weld is an ultrasonic weld or a laser weld.
11. A dispenser as claimed in claim 9 or claim 10, wherein the source and/or the locator and the body are of plastics material.
12. A dispenser as claimed in claim 9 or claim 10, wherein the source is of glass or metal and is coated with plastics material.
13. A dispenser as claimed in claim 9 or claim 10 wherein the source is of un-coated glass or metal.
14. A dispenser as claimed in any one of claims 9 to 13, wherein the weld is between a container of the source and the body.
15. A dispenser as claimed in any one of claims 9 to 13, wherein the weld is between a ferrule of the source and the body.
16. A dispenser as claimed in any one of claims 9 to 13, wherein the weld is between source locator and the body.
17. A dispenser as claimed in any preceding claim, wherein the unification is a membrane around both the source or the locator and the body and unified to both.
18. A dispenser as claimed in claim 17, wherein the membrane is a wrapping.
19. A dispenser as claimed in claim 17, wherein the membrane is a printed label.
20. A dispenser as claimed in claim 17, claim 18 or claim 19, wherein the membrane is of paper.
21. A dispenser as claimed in claim 17, claim 18 or claim 19, wherein the membrane is of plastics material.
22. A dispenser as claimed in any one of claims 17 to 21, wherein the membrane is circumferentially continuous around the body.

23. A dispenser as claimed in claim 17, wherein the membrane is a shrink wrapping.
24. A dispenser as claimed in any one of claims 17 to 21, wherein the membrane is discontinuous around the source or the locator and the body.
25. A dispenser as claimed in claim 24, wherein two or more separate membranes could be used, one to one side of the source or the locator and the body and the other to the other side.
26. A dispenser as claimed in any one of claims 17 to 25, wherein the or each membrane has self-adhesive applied to it.
27. A dispenser as claimed in any one of claims 17 to 25, wherein the or each membrane is of self adhesive material.
28. A dispenser as claimed in any one of claims 17 to 25, wherein adhesive for the membrane is applied directly to the source or the locator and the body.
29. A dispenser as claimed in any one of claims 17 to 25, wherein the source or the locator and/or the body are contoured to enhance the grip of the membrane to them.
30. A method in the production of a dispenser as claimed in any one of claims 1 to 29, the method consisting in the steps of:
- arranging the junction member in the body at its set;
 - longitudinally assembling the source to the body, with the spout engaged with the junction member;
 - temporarily holding the body and the source in a unification position with the spout in its dispense position and the junction member still in its set position; and
 - unifying the body and the source together to fix them in their unified position.
31. A method as claimed in claim 31, wherein the dispenser includes a breath actuation mechanism for releasing the junction member from its set position, whereby the dose is released to the patient and the spout returns from its dispense position to its normal position, the unification step being followed by a simulated breath actuation.
32. A method as claimed in claim 31 or claim 32, wherein the source and the body are relatively located in the temporary holding step by urging the source towards the junction member with a force sufficient to depress the spout towards the source proper and dispense a dose of the substance to the junction member.

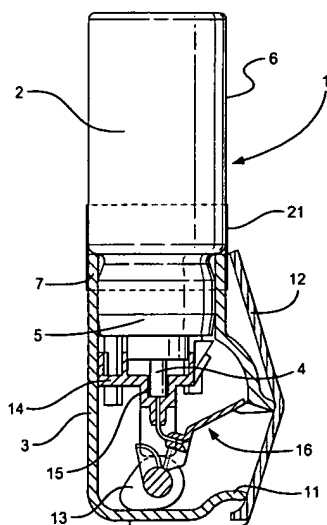


Fig. 1

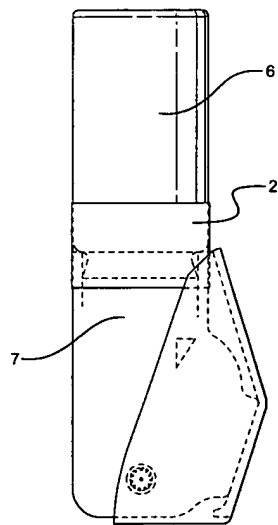
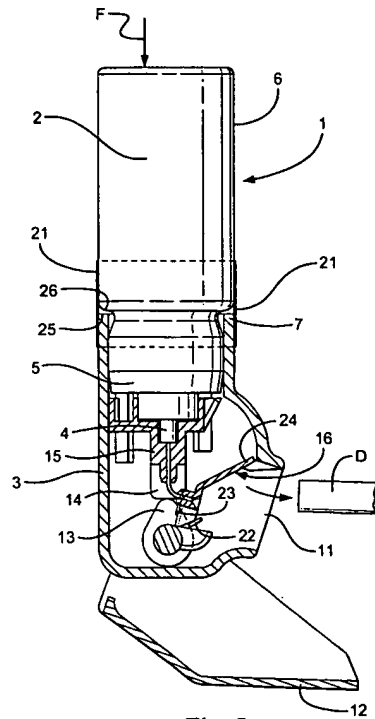
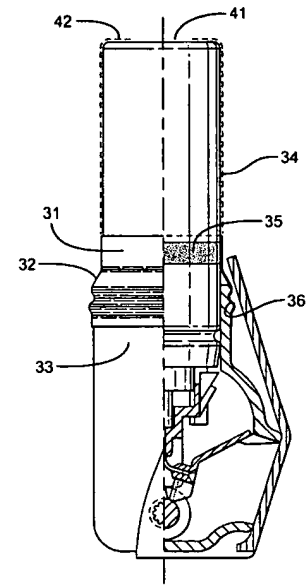


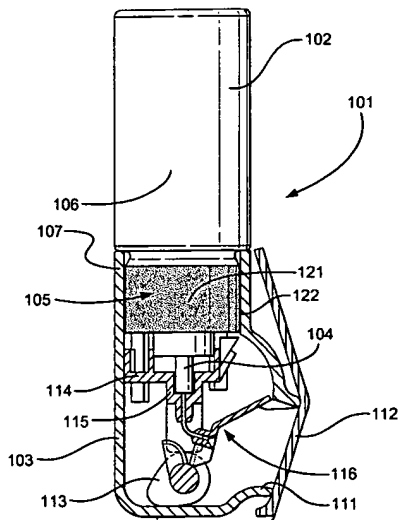
Fig. 2

**Fig.3**

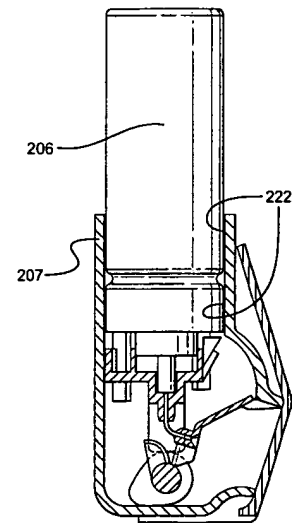
SUBSTITUTE SHEET (RULE 26)

**Fig.4**

SUBSTITUTE SHEET (RULE 26)

**Fig.5**

SUBSTITUTE SHEET (RULE 26)

**Fig.6**

SUBSTITUTE SHEET (RULE 26)

7/9

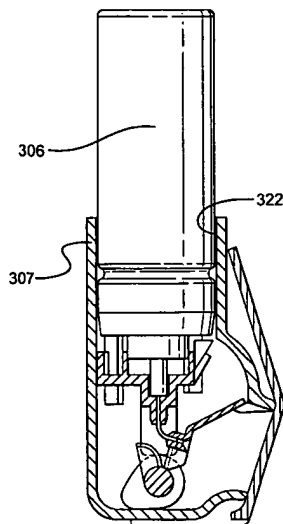


Fig. 7

SUBSTITUTE SHEET (RULE 26)

8/9

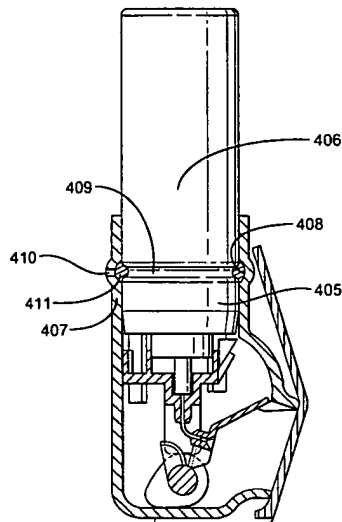


Fig. 8

SUBSTITUTE SHEET (RULE 26)

9/9

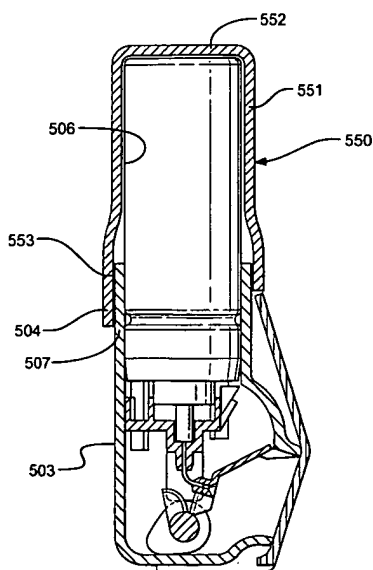


Fig. 9

SUBSTITUTE SHEET (RULE 26)

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/GB 03/01102

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 A61M15/00 B65D83/16		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 A61M B65D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data bases consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, MPI Data, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indications, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02 11802 A (MCDERMENT IAIN GRIERSON ; BACON RAYMOND J (GB); CLINICAL DESIGNS LT) 14 February 2002 (2002-02-14) cited in the application page 14, line 29 - page 16, line 28 figures 6-12	1-29
X	WO 98 41254 A (BACON RAYMOND J) 24 September 1998 (1998-09-24) page 8, line 29 - page 9, line 19 figures 3, 4	1-29
A	DE 295 11 334 U (SCHOTT GLASWERKE) 2 November 1995 (1995-11-02) page 7, line 13 - page 8, line 23 page 9, line 16 - page 10, line 7 figures 1-3	4-29
-/-		
<p>1 Further documents are listed in the continuation of part C.</p> <p>2 Patent family members are listed in annex.</p>		
<p>* Symbols indicating the status of the documents:</p> <p>"X" document opposing the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the representative filing date</p> <p>"L" document which may have doubt on priority claims or which is cited to establish the publication date of another claim or other special reason (as specified)</p> <p>"C" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"I" later document published after the international filing date or priority date and not in conflict with the application but cited to substantiate the principal or theory underlying the invention</p> <p>"2" document of particular relevance; the claimed invention claimed in subsequent claims or carried on conventional or limited on definitive step when the document is relevant to the invention</p> <p>"Y" document of particular relevance; the claimed invention claimed in subsequent claims or carried on definitive step when the document is relevant to the invention or more than one document, each contribution being claimed in a separate claim in the art</p> <p>"S" document mentioned in the same patent family</p>		
Date of the written completion of the international search		
20 June 2003		Date of mailing of the international search report
20 June 2003		03/07/2003
Name and mailing address of the ISA European Patent Office, P.O. Box 5011, D-69110 Heidelberg Tel. (+31-73) 340-2045, Te. 31 851 404 40 Fax (+31-73) 340-2045		Authorized officer AzaTzila, M

INTERNATIONAL SEARCH REPORT

Int'l. Application No.
PCT/GB 03/01102

C/Continuations DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Division of document, with indication where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 775 668 A (TEBRO) 10 September 1999 (1999-09-10) page 5, line 9 -page 11, line 4 figures 1-5 -----	1-3
A	EP 1 008 361 A (BESPAK PLC) 14 June 2000 (2000-06-14) column 5, line 19-27 column 5, line 37 -column 7, line 50 figures 1-3 -----	1-3

Form PCT/ISA(210) continuation of second sheet (July 1993)

INTERNATIONAL SEARCH REPORT

International on patent family members

Int'l. Application No.
PCT/GB 03/01102

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
WO 0211802	A	14-02-2002	AU 2914302 A EP 1303326 A2 WO 0211802 A2 GB 2381461 A GB 2381462 A GB 2381201 A	18-02-2002 23-04-2003 14-02-2002 07-05-2003 07-05-2003 30-04-2003
WO 9841254	A	24-09-1998	AU 727338 B2 AU 6411898 A BG 103715 A BR 9808580 A CN 1255069 T EP 1298065 A2 EP 0969891 A1 WO 9841254 A1 HU 0000760 A2 JP 2001516245 T NO 994065 A NZ 338069 A PL 335978 A1 TR 9902215 T2 US 6422234 B1	07-12-2000 12-10-1998 28-04-2000 30-05-2000 31-05-2000 02-04-2003 12-01-2000 24-09-1998 28-07-2000 25-09-2001 02-11-1999 24-11-2000 05-06-2000 21-02-2000 23-07-2002
DE 29511334	U	02-11-1995	DE 29511334 U1	02-11-1995
FR 2775668	A	10-09-1999	FR 2775668 A1 CN 1291902 T WO 9944662 A1 EP 1059952 A1 JP 2002505163 T US 6397839 B1	10-09-1999 18-04-2001 10-09-1999 20-12-2000 19-02-2002 04-06-2002
EP 1008361	A	14-06-2000	GB 2344534 A EP 1008361 A2 US 6354290 B1	14-06-2000 14-06-2000 12-03-2002

Form PCT/ISA(210) second family member (July 1993)